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PRODUCT LOCATION METHOD UTILIZING PRODUCT BAR CODE AND PRODUCT-  
SITUATED, AISLE-IDENTIFYING BAR CODE

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PRODUCT LOCATION METHOD UTILIZING PRODUCT BAR  
CODE AND PRODUCT-SITUATED, AISLE-IDENTIFYING BAR  
CODE

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(Attorney Docket No: IVC-106A)

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to item  
locators, i.e. item directories, which direct a  
user such as a consumer or shopper, to a specific  
location to view, retrieve, order, purchase or  
otherwise use the information obtained in the  
system. Such directories may be in list or  
booklet form, in-computer-based form, e. g.  
retrievable or presentable on screen, in print  
out, on-line, voice responsive or otherwise.  
These directories may be stationary, e. g. as a  
posted list; portable, as in a sheet or booklet

form; audible, or in some other form, and may be  
activated as by some user action, e. g. pressing  
keys, speaking or otherwise. More specifically,  
the present invention includes a physical system  
5 and a method of collecting location data for  
directories and, in some embodiments, to actually  
create directories, which involves the use of  
product bar codes and product-situated, location-  
identifying bar codes. These are read and matched  
10 (coupled) and stored in a processor to provide  
location information to directory managers and  
subsequent users. Typically, the present  
invention could be used at retail stores to  
locate items to be purchased. Alternatively, it  
15 could be used at a production facility or  
distribution facility having a large number of

parts, to locate specific parts for as needed. In other embodiments, it could be used in non-commercial entities, such as public libraries to locate a particular book.

5           2. Information Disclosure Statement

          The state of the art for acquiring product location information involves the use of manually collected, inputted data. Bar codes have been used for years to identify products, but not to  
10           identify locations.

          The following prior art patents represent various inventions relating to machines involving speech recognition for voice-based operation and thus illustrate known voice recognition  
15           applications:

          U.S. Patent No. 5,111,501 to Masanobu

Shimanuki describes a telephone terminal device equipped with a transmitter microphone, a receiver, a speech recognition unit that receives and recognizes speech signals from the transmitter microphone and a circuit to reduce the level of signals send from a telephone network to the receiver when the speech recognition unit receives speech signals from the transmitter microphone. Further, this device is preferably equipped with a speech reproduction unit that reproduces the speech information stored in a memory, in response to the information of recognition result from the speech recognition unit, and a circuit that prevents transmission of signals from the telephone network to the receiver when the regenerated

speech information is sent to the receiver.

Furthermore, it is desirable for this device to

be provided with a circuit that prevents

generation of ringing tones when an incoming call

5 arrives.

U.S. Patent No. 5,136,634 to David C. Rae et al. describes voice operated facsimile machine

network which includes a method and apparatus for

transmitting specifically requested graphic

10 and/or textual data from an unattended database

storage location to a requestor's facsimile

machine over a telephone line which includes a

host computer such as a PC modified with a

facsimile transmission board and a voice

15 generation board. The host computer receives

incoming phone calls and prompts the caller using

the voice board to select data files by using the  
DTMF keys of a standard telephone handset. The  
PC can be left unattended and can run  
automatically in the facsimile transmission mode.

5 Callers can immediately access needed textual and  
image data with the use of just a standard  
telephone and facsimile machine. Multiple  
workstation nodes can be configured in a network  
setup to handle a high volume of calls in real  
10 time and to allow multiple data services to  
operate simultaneously.

U.S. Patent No. 5,165,095 to Mark A.

Borcherding describes a method for dialing a  
telephone, using voice recognition to initiate  
15 the dialing and to determine the correct  
telephone number. The dialing is initiated with

a spoken dial command that is recognized by using  
speaker independent templates that are stored  
locally with respect to the caller's telephone.  
The correct telephone number is recognized by  
5 using speaker dependent template that are  
downloaded from a central database or by using  
speaker independent templates stored locally.

U.S. Patent No. 5,168,548 to Steven Kaufman  
et al. describes a reporting system which is  
10 disclosed herein, a speech recognizer which is  
used to select selections of text from a report  
form stored in a computer and to insert  
recognized terms in the text thereby to generate  
a report text under voice control. A command  
15 interpreter, also responsive to spoken words,  
initiates creation of the report text and its



subsequent storing, printing and transmission.

The command processor is responsive to respective spoken commands to select a destination telephone number and to cause the report text to be sent to  
5 apparatus for converting report text to image data and for modulating an audio band signal with the image data for facsimile transmission over telephone lines.

U.S. Patent No. 5,222,121 to Keiko Shimada  
10 describes a voice recognition dialing unit of a telephone mounted on a vehicle or similar mobile body and which allows a call to be originated with ease. When the user of the telephone enters a voice command on voice inputting section, the  
15 dialing unit originates a call automatically and thereby connects the other party to the telephone

line. In a call origination procedure, the operations for call origination and the verifications are performed between the user and the unit in an interactive sequence. In a preferred embodiment, the unit has a particular call origination procedure in which, when the other party recognized by the unit is wrong as determined by the user by verification, lower place candidates for the other party are called up in response to a particular voice command. In an alternative embodiment, the unit indicates the other party by voicing a name for verification purpose. The alternative embodiment selects and stores only the name of the other party in response to an entered voice signal and, in the event of response for verification, combines the

name having been stored and response information stored beforehand to produce composite response voice.

U.S. Patent No. 5,231,670 to Richard S.

5 Goldhor et al. describes a system and method for generating text from a voice input that divides the processing of each speech event into a dictation event and a text event. Each dictation event handles the processing of data relating to  
10 the input into the system, and each text event deals with the generation of text from the inputted voice signals. In order to easily distinguish the dictation events from each other and text events from each other the system and  
15 method creates a data structure for storing certain information relating to each individual

event. Such data structures enable the system  
and method to process both simple spoken words as  
well as spoken commands and to provide the  
necessary text generation in response to the  
5 spoken words or to execute an appropriate  
function in response to a command. Speech  
recognition includes the ability to distinguish  
between dictation text and commands.

U.S. Patent No. 5,239,586 to Kuniyoshi Marui  
10 describes a voice recognition system which  
comprises a handset and a hands-free microphone  
for generating an input audio signal, a high-pass  
filter for eliminating low frequency components  
from the signal from the handset or hands-free  
15 microphone, a signal level controller for  
adjusting the level of the high-pass signal in

response to the user of either the handset or  
hands-free microphone, a storer for storing the  
speech data and a controller for controlling the  
storer so that a user's utterance is stored or  
5 the user's utterance is recognized by comparing  
the utterance to speech data already stored. The  
handset hook switch provides an on-hook control  
signal to reduce amplifier gain during hands-free  
microphone operation.

10 U.S. Patent No. 5,301,227 to Shoichi Kamei  
et al. describes an automatic dial telephone that  
is useable in a motor vehicle, when a voice input  
is provided during a period in which input of the  
names of called parties is awaited, a voice  
15 pattern of the name of the called party is  
compared with reference patterns of called

parties stored in reference patterns storing  
device, to determine the degree of the similarity  
therebetween. The names of the called parties  
are output to a user in the order of decreasing  
5 degree of similarity. Each time the name of a  
called party is output, a command word for  
confirmation is waited from a user for a  
predetermined time period. When a voice  
confirmation command is input and is recognized  
10 during this waiting period, a telephone number  
corresponding to the name of the called party is  
supplied to a channel. Consequently, the command  
word for confirmation may be input only if the  
name of the called party outputted is one desired  
15 by the user. Sensors continually monitor the  
driving condition of the motor vehicle in which

the telephone is installed. When the operation of the steering wheel or brakes of the motor vehicle exceeds a predetermined threshold or the speed of the motor vehicle is excessive, the sensors generate safety signals that inhibit the operation of the telephone.

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U.S. Patent No. 5,335,276 to E. Earle

Thompson et al. describes a communication system which is provided with multiple purpose personal communication devices. Each communication device includes a touch-sensitive visual display to communicate text and graphic information to and from the user and for operating the communication device. Voice activation and voice control capabilities are included within communication devices to perform the same functions as the

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touch-sensitive visual display. The  
communication device includes a built-in modem,  
audio input and output, telephone jacks and  
wireless communication. A plurality of  
5 application modules are used with personal  
communication devices to perform a wide variety  
of communication functions such as information  
retrievable, on-line data base services,  
electronic and voice mail. Communication devices  
10 and application modules cooperate to allow  
integrating multiple functions such as real time  
communication, information storage and  
processing, specialized information services, and  
remote control of other equipment into an  
15 intuitively user friendly apparatus. The system  
includes both desktop and hand-held communication



devices with the same full range of communication capabilities provided in each type of communication device.

U.S. Patent No. 5,349,636 to Roberto

5           Irribarren describes a communication system for verbal telephonic communication which has a voice message system for storing and retrieving voice messages integrated with a computer database accessing system for storing and retrieving text  
10           messages from a separate computer system and for converting the text messages into voice. The systems are integrated via a network which coordinates the functions of each individual system. Additionally, the input/output ports of  
15           the voice message system and the computer database accessing system are connected in a

parallel fashion to at least one telephone line.

In this configuration a user may access both

voice messages and database information,

including text or electronic mail messages, with

5 a single telephone call. Optionally, facsimile

messages can be stored, retrieved and manipulated

with a single telephone call.

U.S. Patent No. 5,406,618 to Stephen B.

Knuth et al. describes a telephone answering

10 device that is activated by a proximity sensor

when a user crosses its field of detection and

whose operation is controlled by simple voice

commands. The device incorporates speaker-

independent voice recognition circuitry to

15 respond to spoken commands of the user that are

elicited by a system generated voice request

menu. The telephone answering device performs  
all the basic functions of a telephone answering  
machine in response to these simple commands and  
there is no need for the user to manually operate  
5 the telephone answering device.

U.S. Patent No. 5,602,963 to W. Michael  
Bissonnette et al. describes a small, portable,  
hand-held electronic personal organizer which  
performs voice recognition on words spoken by a  
10 user to input data into the organizer and records  
voice messages from the user. The spoken words  
and the voice messages are input via a  
microphone. The voice messages are compressed  
before being converted into digital signals for  
15 storage. The stored digital voice messages are  
reconverted into analog signals and then expanded

for reproduction using a speaker. The organizer  
is capable of a number of different functions,  
including voice training, memo record, reminder,  
manual reminder, timer setting, message review,  
5 waiting message, calendar, phone group select,  
number retrieval, add phone number, security and  
"no" logic. During such various functions, data  
is principally entered by voice and occasionally  
through use of a limited keypad, and voice  
10 recordings are made and played back as  
appropriate. A visual display provides feedback  
to the user. During the various function, the  
user can edit various different data within the  
organizer by eliminating or correcting such data  
15 or entering new data.

U.S. Patent No. 5,621,658 to Brion K.

Jackson describes an action contained within an electronic mail object which is communicated from a data processing system to another data processing system via an audio device. The action is executable on a data processing system. At the sending data processing system, the action is converted to a predetermined audio pattern. The electronic mail object may contain text in addition to an action. The text is also converted to an audio pattern. The audio patterns are then communicated to the audio device over telephone lines or other communication medium. At the receiving end, the audio device records the object. A user can provide the recorded object to a data processing system, which then executes the action and

converts the text audio patterns back to text.

In addition, the action can be converted to text and displayed on the data processing system.

U.S. Patent No. 5,631,745 to John J. Wong et  
5 al. describes a telephone terminal adapted for  
business or home use that includes the ability to  
receive and send facsimiles, a voice answering  
function and a computer modem. Various input and  
output devices may be used for the facsimile  
10 function. A voice annotated facsimile may be  
sent and received. At the same time the  
facsimile is viewed on a video monitor or  
ordinary television set, an accompanying voice  
message is heard through the sound system of the  
15 monitor or television set. The terminal has an  
architecture including a central processor and an

internal bus structure to which several types of  
memory, various input-output devices and an  
interface with the telephone line are connected,  
among others. Audio Random Access Memory (ARAM)  
5 is used for storing both facsimile data and voice  
data.

U.S. Patent No. 5,671,328 to Gregory P.

Fitzpatrick et al. describes a method and data  
processing system which are disclosed for  
10 automatically creating voice processing template  
entries. In one embodiment, the invention  
automatically assembles a plurality of commands  
received by the data processing system, at least  
one of said commands having a voice recognition  
15 criteria component associated therewith, counts  
the occurrences of the plurality of commands,

assembles voice recognition criteria components  
associated with the plurality of commands, and,  
as a result of the occurrence count exceeding a  
predefined minimum, constructs a voice  
5 recognition template entry by associating the  
assembled voice recognition criteria components  
with the assembled plurality of commands.

U.S. Patent No. 5,850,627 to Joel M. Gould  
et al. describes a word recognition system which  
10 can: respond to the input of a character string  
from a user by limiting the words it will  
recognize to words having a related, but not  
necessarily the same, string; score signals  
generated after a user has been prompted to  
15 generate a given word against words other than  
the prompted word to determine if the signal



should be used to train the prompted word; vary  
the number of signals a user is prompted to  
generate to train a given word as a function of  
how well the training signals score against each  
5 other or prior models for the prompted word;  
create a new acoustic model of a phrase by  
concatenating prior acoustic models of the words  
in the phrase; obtain information from another  
program running on the same computer, such as its  
10 commands or the context of text being entered  
into it, and use that information to vary which  
words it can recognize; determine which program  
unit, such as an application program or dialog  
box, currently has input focus on its computer  
15 and create a vocabulary state associated with  
that program unit into which vocabulary words

which will be made active when that program group  
has the focus can be put; detect the available  
computational resources and alter the  
instructions it executes in response; test if its  
5 ability to respond to voice input has been shut  
off without user confirmation, and, if so, turn  
that ability back on and prompt the user to  
confirm if that ability is to be turned off;  
store both a first and a second set of models for  
10 individual vocabulary words and enable a user to  
selectively cause the recognizer to disregard the  
second set of models for a selected word; and/or  
score a signal representing a given word against  
models for that word from different word model  
15 sets to select which model should be used for  
future recognition.

Notwithstanding the prior art, the present invention is neither taught nor rendered obvious thereby.

SUMMARY OF THE INVENTION

5           The present invention is directed to a  
  
method of creating data for directories for  
  
locating items so that the directories are  
  
efficiently loaded with location data both prior  
  
to use by the customers or other users, as well  
  
10       as, in some preferred embodiments, so that the  
  
directories may be updated as desired while in  
  
use. This method involves utilization of bar  
  
codes to determine item identity, and the use of  
  
separate bar codes to determine locations. These  
  
15       separate location-identifying bar codes are  
  
physically located on the items (products), e. g.

on the product wrappings, for example, near the  
product bar codes. These bar codes would identify  
aisles, shelves, bin walls, parking spaces, etc.

This location data is read in conjunction with

5 item identification data by bar code readers, fed

to a processor in a recognizable combined format,

and then stored and used as the resource data of

the directory and/or becomes the directory

itself. Once the item/corresponding location data

10 is created, it may be used to print out or

publish directories, it may become available by

wireless service, by internet, or be screen

presentable or retrievable, as in the case of

keyboard/monitor type directories, or any

15 combination of the foregoing.

For example, a supermarket could assign

unique bar codes to each aisle, create bar code labels and attach them to one or more samples or units of each item, and then program the system according to the following simple process:

5                   a) The processor will be programmed to read  
and identify products by the universal price code  
("UPC") inputs from a bar code reader, and will  
likewise be programmed to recognize and identify  
locations by bar code inputs from a bar code  
10                  reader, that is, the processor will be programmed  
to understand the codes created for particular  
locations to be included in the supermarket  
product location system;

                  b) The processor will also be programmed to  
15                  match items (products) to locations when read  
before or after location readings. In other

words, when a reader inputs a location bar code  
from one item, and then reads the UPC or other  
item-identifying bar code of the item, this tells  
the processor to create a matching set of pairs  
5 of products and locations for each product read.  
In an alternative embodiment, each type of item  
could be read after the location reading to  
create location data pairings. The created,  
stored data may then be used for the directory or  
10 directories in any desirable manner and form,  
including those described above.

A locator system having these directories  
may be a stand alone device, but in many  
embodiments would be part of an internal  
15 connected system. It could be an intranet or  
secured internet system, but would in many cases

be a storewide system with a plurality of user locations (units, phones, or microphones, with feedback at each location). The system could merely be a set of print outs at various

5 locations around the store or other facility, or could be one or more keyboard/monitor sets where a customer would type in the desired item (product), or the system could be more significant and include voice activation and/or

10 voice recognition and/or voice response. These more sophisticated systems could include an embedded voice-driven interface for speech control of: (1) operational instructions; (2) core system locator function operations, that is,

15 recognition of specific requests and responses thereto; and, (3) optional and default functions.

Thus, the system utilizing the present invention method could include a device which is both operated by speech (speech or voice activated) and speech responsive (voice answers and instructions to the user from the system). Thus, the system may rely upon automatic speech recognition (ASR), either in place of or in addition to manual locator systems, e.g. book, list, map and computer directories.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention should be more fully understood when the specification herein is taken in conjunction with the drawings appended hereto wherein:

Figure 1 illustrates a block diagram showing



the system and method of creating a directory in accordance with the present invention; and,

Figures 2a and 2b show a general schematic diagram showing software and functional features of a present invention method and its incorporation into a voice-based item locator system, including the present invention method of creating item /location data pairs.

#### DETAILED DESCRIPTION OF THE PRESENT INVENTION

The present invention is a method and system for creating data for item location directories. By "item" is meant a place or thing that a user desires to locate. Thus, a item could be a particular brand of canned string beans, a type of outdoor stain, a booth at a convention, a particular part in inventory for sale, assemblage

or distribution, a particular automobile in a  
production facility lot or in a large parking  
garage, or a room, a functional group or a  
person's desk in an office building or the like.

5       The "location" may be in the form of a word or  
sentence presented visually or audibly and/or it  
may designate an aisle, a shelf, a bin number, a  
room number, a row and slot or space, etc.

          An important aspect of the present invention  
10       is the system of software and hardware  
(equipment) to utilize the present invention  
method of creating item location information for  
directories. It involves using item-identifying  
bar codes on items to be included and using  
15       location-identifying bar codes for corresponding  
locations, also taken from the items. The

location-identifying bar codes are physically placed on the items themselves by the company which is stocking them.. For example, they are located on the items or products to identify  
5 aisles, shelves, bins, drawers, floor area grids, etc.

The location-identifying bar codes may be custom created for the locations or may be established as a universal location system.

10 Alternatively, a manager could use existing UPC bar codes for the locations, provided that they were different from the items to be located, and provided that the system were programmed to correlate these particular codes to specified  
15 locations.

The item-identifying bar codes are typically

located on the items themselves, but when more  
than one identical item is included, a single  
item of the set of identical items will be  
sufficient for the method to work. However, it is  
5 preferred that all items in each set have the bar  
code located thereon. In some preferred  
embodiments, the bar codes for the items are  
Universal Price Code (UPC) bar codes, but the  
present invention need not be limited thereto,  
10 such as when it would be more appropriate to  
create unique identifying codes for each and  
every item, such as automobiles, artwork, etc.

The essential features of the present  
invention system include the item-identifying bar  
15 codes, the location-identifying bar codes, the  
items and their locations, at least one bar code

reader and at least one processor.

Figure 1 illustrates the present invention in block diagram, showing a preferred embodiment of the method and system of creating a directory.

5 In this embodiment, a plurality of identical items comprise a set, and there are a plurality of such sets. Thus, there are a number of sets of items at a specific location, and a plurality of such locations. This model could be a department  
10 store, a grocery store, a hardware store, etc. As shown in the Figure, there are three different locations and each has three different sets of items. Location First 3 has Items A, B and C; Location Second 5 has Items D, E and F; Location  
15 Third 7 has Items G, H and I. Location First has its own unique identifying bar code 9; Location

Second has its own unique identifying bar code 11  
and Location Third has its own unique identifying  
bar code 13. Likewise, Items A through I each  
have there own unique product identifying bar  
codes, and, in this case, Universal Price Codes  
(UPCs). Representative is Item A shown as item 15  
with its own UPC 17, and with location bar code  
20 likewise attached thereto.. Bar code reader 19  
is used to read the location bar codes and  
product bar codes in a manner consistent with a  
program-required sequence ( i.e. the sequence  
must conform to what the software has been  
programmed to expect, such as, first reading is  
product, second reading is corresponding  
location). The readings are processed to convert  
optical readings to digital and the digital data

may be used to create hard copy, such as  
directory 23 shown, or screen presentation, or  
audio, or voice activated, or combinations of  
offerings for directory access.

5                   Figures 2a and 2b show a general schematic  
diagram of a present invention method and its  
integration into a voice-based directory system,  
showing general software features and functional  
features. Thus, the present invention includes a  
10                   method, and a system with the software and  
hardware for the creation of item/location data  
pairs, as described above.

                  In Figure 2a, the basic aspects of the  
item/location information data creation method  
15                   are set forth in schematic form. The unique  
item-identifying bar codes are attached 12 to at

least one of each different item for a plurality  
of sets of items, each set having items different  
from the items in the other sets. Likewise,  
unique location-identifying bar codes are  
5 attached 14 to the corresponding items situated  
at those locations, and, subsequently, they are  
read 16 in predetermined manner so that the  
program recognizes sequences and creates data  
sets, e. g. data pairs, to develop the  
10 item/location vocabulary for the system. This  
information is included in manager inputs 10  
(referenced also in Figure 2b as inputs 13). The  
method shown in Figure 2a is repeated as needed  
for updating 18.

15 Figure 2b illustrates features of the  
overall item locator system in which the present



invention system and method are used, and  
includes a central processor 11 which may be an  
external or internal component, i.e., within a  
single unit or at a separate location from audio  
5 receivers and transmitters , e.g.,  
microphones/speakers for user inputs and feedback  
to users.

The system may be preprogrammed with the  
user being required to follow concise  
10 instructions for activation and operation, or may  
be programmable to alter, add or enhance ease or  
methods of use, e.g. through a limited access  
code, for manager inputs 13 of user instructions.

In any event, manager inputs 13 shall include  
15 functional selections and inputs of items and  
their locations, with provision for subsequent

access for modifications. This programming may include direct keyboard, voice, etc., and, as mentioned, may include security capabilities for preventing unauthorized use, e.g. voice  
5 identification (user recognition) or user security code system, as well as other options which may be included therein, such as a "help" detailed manager instruction section.

Once the system has been programmed for use,  
10 the user operation unit(s) 15 provide functional access, which may be passive, i.e., the user speaks, picks up a phone, presses a button, or otherwise takes some action to activate the system; or it may be active, i.e., a proximity  
15 sensor, a periodicity timer, or other internal mechanism may automatically activate the system

and could trigger an audio or visual query, such as "May I help you locate a product?"

5           Once the system has been activated and a user has stated the necessary words of input to activate the device, recognition/non-recognition response 17 results from processing the user inputs to central processor 11 , and audio and/or video response unit(s) 19 provide feedback 21 to the user, either by answering the inquiry, 10 conditionally defaulting, e.g., asking for a repeat or a restate the question, or fully defaulting, e.g. directing the user to a courtesy desk or check out counter for additional assistance.

15           Obviously, numerous modifications and variations of the present invention are possible

in light of the above teachings. It is therefore understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

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